

that yeast has little, if any, influence on the bouquet of wine. The true character of a wine, he maintains, is due to numerous factors, among which the variety of grape and the character of the soil and climate preponderate; and the yeast does produce any flavour, it is indistinguishable among these.

If, however, the author passes adverse judgment on selected yeasts regarding their power of conferring flavour, he does not do so with regard to their use for setting up a rapid and healthy fermentation in wine must. For this purpose he advocates their use warmly, but insists on the employment of a selected indigenous yeast as more calculated to be in harmony with the environment than if it was derived from a foreign source.

The valuable results which have accrued from Emil C. Hansen's remarkable studies on yeast have already led to so many successful results in technical practice, that we still feel inclined to suspend judgment regarding the non-efficiency of wine yeast in the matter of flavour until M. Dugast's interesting observations are confirmed in other quarters.

In conclusion, we call special attention to this book as likely to be useful to our Colonial wine-growers of Australia and the Cape; the climate of these countries is somewhat similar to that of Algeria, and no doubt some of the special difficulties discussed in this book are also met with in these countries.

A. J. B.

THE FAUNA OF THE SHETLANDS.

A Vertebrate Fauna of the Shetland Islands. By A. H. Evans and T. E. Buckley. Pp. xxix + 248. (Edinburgh: D. Douglas, 1899.)

ALTHOUGH it would be too high a meed of praise to say that the authors have done for the Shetlands what Gilbert White did for Selborne (the systematic treatment of the fauna not being favourable to colloquial writing), there is no doubt that they have succeeded in producing a very interesting volume, and one which should be indispensable to every visitor to the most northern group of the British Islands, whether or no he be specially interested in birds. For in place of restricting themselves to a detailed account of the various members of their vertebrate fauna, Messrs. Evans and Buckley have furnished a very interesting description of the more striking physical features of these islands, together with numerous notes on the people and their mode of life. But perhaps the most generally attractive feature of the work will be the exquisite views of Shetland scenery with which it is adorned; these illustrations reflecting the highest credit alike on the photographer and on the artist responsible for their reproduction in the present form. In introducing these scenic pictures, in place of figures of the birds recorded as members of the fauna, the authors have undoubtedly exercised a wise discretion. In only one instance have they made a natural history object the chief feature of an illustration; the one exception being the beautiful plate of the nest and young of the great skua—a bird of all-absorbing interest to the naturalist in the Shetlands.

And here it is proper to mention that the volume before us forms a part of the vertebrate fauna of Scotland, of which several volumes by Messrs. Harvie-Brown

and Buckley have already appeared. It seems that Mr. Evans, who has an extensive personal acquaintance with the Shetlands, had an idea of writing an independent work on its animals. The securing his services as a contributor to the larger undertaking will commend itself to all.

After devoting fifty-four pages to a well-written description of the physical features of the country, the authors proceed to their proper subject—the detailed account of the vertebrates, which includes both the terrestrial and the marine forms. In the classification of the birds they follow in the main the scheme of Mr. H. Saunders, and though they suggest that some amendments might perhaps have been made had it not been for the sake of uniformity with the "Fauna of Orkney," yet we are glad to know from his volume in the Cambridge "Natural History" that Mr. Evans, at least, is no friend to the plan of unnecessarily multiplying the genera of British birds, nor to the "*Scomber scomber*" principle.

In the classification of mammals, especially when we note the statement that Mr. Eagle Clarke has *carefully* revised the proofs, it is somewhat surprising to find the narwhal included among the *Physeteridae*. Neither do we see the necessity of regarding the porquas as the representatives of a family by themselves. But, altogether apart from such trivial details, we must take exception to the practice of including introduced species among mammalian faunas. In the present instance the authors note five species of rodents as belonging to the Shetland fauna, whereas only one of these—*Mus sylvaticus*—is really indigenous. The trouble such methods cause to those who have occasion to write on the geographical distribution of animals is best known to themselves. If introduced forms are mentioned at all, their foreign origin ought to be indicated in such a manner that it will catch the eye of the reader at the first glance. In the case of birds, such as the ruff, which but rarely visit the islands, some conspicuous notification of the fact would likewise be advantageous, although we are ready to acknowledge that the line between regular visitors and accidental stragglers is very hard to draw.

The above mention of *Mus sylvaticus*—the long-tailed field-mouse—reminds us that one of the most important objects of histories of island faunas is to point out whether the indigenous animals are in any way distinguishable from those inhabiting the nearest mainland. In the case of birds of strong flight such differences are not likely to occur, but they should be looked for in birds that never leave their island home, and in the indigenous mammals. On the special characters of the Shetland field-mouse the authors are silent, which in view of Mr. Barrett-Hamilton's recent recognition of a peculiar representative of this type in St. Kilda is distinctly to be regretted. In the case of the common wren, which has likewise a peculiar local race in St. Kilda, the authors state that the Shetland form differs to a certain extent from the one found on the Scottish mainland, although not, in their opinion, sufficiently so as to be entitled to be regarded as representing a distinct race. If this be so, and the field-mouse be indistinguishable from the mainland form, it suggests that the Shetlands have been separated from the mainland at a later date than have the Hebrides;—but this is just one of the cases where

we should have liked a well-considered opinion from the authors!

In an area like the Shetlands the great interest, from a faunistic point of view, centres on the birds; and among these the great skua holds the foremost place, since its only British breeding-stations are on these islands. So much has been of late years written on this subject, both in newspapers and in ornithological journals, that it is one with which the public are tolerably well acquainted. Nevertheless, the account given by the authors of the almost complete extermination of this fine species, and its subsequent rehabilitation by the efforts of various members of the Edmonston family and Mr. Scott, of Melby, will be read with interest, and forms a concise summary of the whole affair. We should, however, like to know more with regard to the meaning of the statement that "protection for the skuas implies some measure of protection also for the gulls; but unless the latter greatly increase, the former cannot be expected to do so."

Some interest also attaches to the specimen of the collared pratincole killed by Bullock in 1812, as being the only example of the species hitherto shot in North Britain. In the fourth edition of "Yarrell" the skin is stated to be in the British Museum, but the investigations of the authors fail to confirm this statement.

Greater attention is, however, merited by the account of the nesting of the storm petrel, which sometimes lays its eggs among large stones on the shore, and in other cases selects deserted rabbit-burrows for its home. The crofters, knowing the value set on the eggs of this bird by collectors, and being likewise extremely partial to young petrels as a *bonne bouche*, are extremely reluctant to indicate the rabbit-holes in which the birds nest to strangers.

To many it will come as a surprise to learn that ravens are still common in the islands; so numerous, indeed, as in certain districts to prove very destructive to the poultry and stock, on which account war is waged against them by the crofters. In contrast to the abundance of these birds is the scarcity of rooks, which are, indeed, little more than casual visitors to the islands.

The weakest point about the book is undoubtedly, as the authors themselves are fain to confess, the section on fishes, the classification followed being altogether obsolete and discredited.

R. L.

PHYSICAL CHEMISTRY.

Introduction to Physical Chemistry. By James Walker, D.Sc., Ph.D. Pp. x + 332. (London: Macmillan and Co., Ltd.)

IT is now nearly ten years since Prof. Walker placed English students under obligation by his admirable translation of Ostwald's "Outlines of General Chemistry." Since that time "little Ostwald" has been the source from which most students have taken their first draught of information about physical chemistry in its modern form. The phrases and paraphrases of the book, the diagrams, the perpetual motions "which are impossible" have become almost painfully familiar to the examiner. The present writer is one of those who believe that

Ostwald's book has been of the highest service to chemistry. At the same time, it must be admitted that it is one to be used with care. There is an illusory appearance of simplicity about it, and if care be not taken the use of the book is eminently calculated to lead to a learned smattering. It is, in fact, a book which forms the summary of a course of instruction, and for beginners it must be supplemented by an extended commentary by an experienced teacher.

These observations arise inevitably in connection with Prof. Walker's new book, which, in size, appearance and typography, as well as in its topics, bears so striking a resemblance to Ostwald's "Outlines." The first question that the reader will ask is—Where lies the difference between the two books? This question is soon answered as one reads; Prof. Walker's book is more limited in range and incomparably simpler. To quote the author's words, it "makes no pretension to give a complete or even systematic survey of physical chemistry"; the aim is to give a full discussion of some of the chief principles of modern physical chemistry, and to show their application to ordinary laboratory chemistry.

Dr. Walker has achieved his purpose in a most satisfactory manner, and has produced a book which will be a real boon to students of physical chemistry. He writes with the knowledge of a specialist and the experience of a teacher, and it is very striking to any one who knows the difficulties of students to see how perfectly Dr. Walker appreciates them. Not less striking are the expository power and resourcefulness with which the difficulties are handled. Whilst the whole book is clear, readable, and abreast of the times, some chapters deserve special attention. The one on chemical equations is amongst these. It gives a rational account of the art of constructing chemical equations by dissection and summation, a subject which has been strangely neglected by text-book writers. The chapter on fusion and solidification is made very clear by a thorough discussion of the mutual relations of salt, ice and water. The wide generalisation, or group of generalisations known as the Phase Rule, is expounded within reasonable limits. Hitherto there has been nothing concise on this subject in the English language. The chapters relating to the modern theories of solution are, it need scarcely be said, written with fulness of knowledge and in the spirit of a true believer in the doctrine of electrolytic dissociation. Chemical dynamics is treated succinctly, and admirably illustrated by examples. There is a distinct gain here in departing from the strict historical development of the subject, which is apt to confuse beginners by the series of fresh starts which it involves. The concluding chapter on thermodynamical proofs is made as clear as it well could be. At the end of each chapter references are given to original articles which have appeared in English journals and to English books. The list of these is quite gratifying, but the wisdom of confining the references to English publications seems questionable. The extraordinary backwardness of students in acquiring a reading knowledge of German is condoned by such a restriction; and, besides this, it would have been a service to many students who have some knowledge of the language if Dr. Walker had helped them to select